



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: **062013-010** Project Number: 2012-04-022
Installation Number: 139-0049

Parent Company: Shamrock Proppants, LLC

Parent Company Address: 122 Highway ZZ, Wellsville, MO 63384

Installation Name: Shamrock Proppants, LLC

Installation Address: 122 Highway ZZ, Wellsville, MO 63384

Location Information: Montgomery County, S28, T50N, R6W

Application for Authority to Construct was made for:

A new plant that manufactures ceramic proppant. This review was conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

JUN 20 2013

EFFECTIVE DATE

Kyra L Moore

DIRECTOR OR DESIGNEE

DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Departments' Air Pollution Control Program of the anticipated date of start up of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start up of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Shamrock Proppants, LLC
Montgomery County, S28, T50N, R6W

1. Control Device Requirement-Baghouse
 - A. Shamrock Proppants, LLC shall control particulate emissions from the emission units in Appendix A which are stated as having baghouses by enclosing and venting each particulate point source listed in Appendix A to a baghouse. The enclosures of the emissions units shall be constructed and maintained such that no visible emissions are allowed to occur from these sources except through the gases exiting from the baghouse.
 - B. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. Each baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them.
 - C. Replacement filters for the baghouses shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - D. Shamrock Proppants, LLC shall monitor and record the operating pressure drop across the baghouses at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - E. Shamrock Proppants, LLC shall maintain an operating and maintenance log for the baghouses which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

2. Stack Testing Requirements

- A. Shamrock Proppants, LLC shall verify that the emission rates listed in Table 2 are not exceeded for the total particulate matter (PM) (condensable and filterable), particulate matter less than 10 microns in diameter (PM₁₀) (condensable and filterable), particulate matter less than 2.5 microns in diameter (PM_{2.5}) (condensable and filterable), nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrogen fluoride (HF) and total fluoride emissions from the dryers (EP-14 and EP-15).

Table 1: Emission Rates for each Dryer (EP-14 and EP-15)

Pollutant	MHDR (tons per hour) ^a	Controlled Emission Rates (lb/hr) ^b
PM	60	0.028
PM ₁₀	60	0.01484
PM _{2.5}	60	0.00504
NO _x	60	2.394
SO _x	60	0.007
HF	60	0.001
Total Fluorides	60	0.001

^aMHDR = Maximum Hourly Design Rate for each dryer

^bEmissions of HF and total fluorides are not expected from the dryers (EP-14 and EP-15) and were not included in the potential emissions of the application. However, testing is required for verification purposes.

- B. Shamrock Proppants, LLC shall verify that the emission rates listed in Table 2 are not exceeded for the total PM (condensable and filterable), PM₁₀ (condensable and filterable), PM_{2.5} (condensable and filterable), NO_x, SO_x, HF, total fluorides and hydrogen chloride (HCl) emissions from the kilns (EP-26 and EP-28).

Table 2: Emission Rates for each Kiln (EP-26 and EP-28)

Pollutant	MHDR (ton per hour) ^a	Controlled Emission Rates (lb/hr)
PM	20	0.499
PM ₁₀	20	0.337
PM _{2.5}	20	0.0893
NO _x	20	0.227
SO _x	20	18.774
HF	20	1.362
Total Fluorides	20	2.171
HCl	20	0.626

^aMHDR = Maximum Hourly Design Rate for each kiln.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- C. Shamrock Proppants, LLC shall conduct stack testing on the specified number of baghouses from each group listed below in order to verify that the emission rates for PM₁₀ and PM_{2.5} are not exceeded.

Table 3: Emission Rates from the Baghouses

Group No.	Group Description	Affected Emission Points	Number of Baghouses to be Tested from Group	Controlled PM ₁₀ (PM _{2.5}) Emission Rates (lb/hr)
1 ^a	Bins – feed (Prior to Mixing)	EP-02 and 03	1	Calcined Raw Material
				0.0480 (0.0144)
2	Bins - product	EP-30 ,31, 38, 39, 40, 41, 42, 43, 48, 49, 51, 52, 53, 54, 55, and 56	1	True MDHR (tph) X 0.06 (0.018)
3 ^a	Bucket Elevators – feed (Prior to Mixing)	EP-04	1	Calcined Raw Material
				0.0480 (0.0144)
4	Bucket Elevators – product side	EP-35, 36, 37, 45, 46, 47, 57, 58, and 59	1	True MDHR (tph) X 0.06 (0.018)
5	Ball-Mills	EP-06 and 07	1	0.0264 (0.0264)
6	Mixer	EP-13	1	0.0098 (0.0030)
7	Screens - feed	EP-18 and 19	1	0.0264 (0.0264)
8	Screens - product	EP-32, 33, and 34	1	0.0320 (0.0320)
9	Hammermill	EP-22A and 22B	2	0.0264 (0.0264)
10	Loadout	EP-60 and 61	1	0.5355 (0.1607)

^a To be tested while handling Calcined Clay

- D. This testing may be limited to conducting tests on a representative piece(s) of each type of equipment upon written request from Shamrock Proppants, LLC and approval by the Director. These tests shall be done in accordance with the procedures outlined below.

- E. A completed Proposed Test Plan (form enclosed) must be submitted to

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

the Air Pollution Control Program at least 30 days prior to the proposed test date of any such performance tests so that a pretest meeting may be arranged, if necessary, and to assure that the test date is acceptable for an observer to be present. The Proposed Test Plan must include specification of test methods to be used and be approved by the director prior to conducting the required emissions testing.

- F. The stack testing shall be performed within sixty (60) days after achieving the maximum production rate of the kilns (EP-26 and EP-28) but not later than 365 days after initial start of operation. These tests shall be conducted at the MHDR in Table 5 or within 10 percent of the MHDR. If the tests are conducted below 90 percent of the MHDR, then the tested production rate is the new MHDR.
- G. Two copies of a written report of the performance test results must be submitted to the director within 90 days of completion of the performance testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required Environmental Protection Agency (EPA) Method for at least one sample run for each air pollutant tested.
- H. No later than 30 days after the performance test results are submitted, Shamrock Proppants, LLC shall provide the director with a report that establishes the potential emissions of all pollutants for the emission units tested according to Special Condition 2.A, 2.B, and 2.C. The emission rates shall be reported in pounds per hour and tons per year so that the Air Pollution Control Program may verify the potential emissions of this project. If the potential emissions are greater than what was indicated in this permit, then Shamrock Proppants, LLC shall submit an application for an amendment to this permit to correct the potential emissions calculations.
- I. The above time frames associated with this performance testing condition may be extended upon written request of Shamrock Proppants, LLC and approval by the Director.

3. Performance Testing for New Source Performance Standards (NSPS)

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- A. Within 30 days of the initial start of operation, Shamrock Proppants, LLC shall submit a determination to the Compliance/Enforcement Section of the Air Pollution Control Program on the applicability of 40 CFR 60, Subpart OOO, *Standards of Performance for Nonmetallic Mineral Processing Plants*, for each piece of equipment listed in Appendix A. Shamrock Proppants, LLC shall indicate whether or not each piece of equipment is subject to Subpart OOO and the applicable requirements.
 - B. Shamrock Proppants, LLC shall submit the enclosed testing plan to the Compliance/Enforcement Section of the Air Pollution Control Program for all equipment with applicable testing requirements as determined in Special Condition 3.A. Shamrock Proppants, LLC shall contact the Compliance/Enforcement Section to obtain all requirements for testing, and the plan must be submitted to the Compliance/Enforcement Section at least 30 days prior to the proposed test date.
 - C. Testing must be performed no later than 60 days after achieving the maximum production rate of the process, and in any case no later than 180 days after initial startup. The performance test results shall be submitted to the Compliance/Enforcement Section no later than 30 days after completion of any required testing.
4. Paved Roads
 - A. Shamrock Proppants, LLC shall maintain and/or repair the portions of the haul road described in the Application for Authority to Construct as paved. Maintenance of the surfaces will be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these areas while the plant is operating.
 - B. Shamrock Proppants, LLC shall periodically water, wash and/or otherwise clean all the paved portions of the haul roads as necessary to achieve control of fugitive emissions from these roads.
5. Diesel Generator No. 1(EP-62) - Specifications, Operating Limits and Emission Limits
 - A. The emergency generator shall be fired with diesel fuel or #2 fuel oil.
 - B. The emergency generator shall be limited to one (1) hour per month for testing during the hours of 8:00 AM to 12:00 PM.

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The permittee is authorized to construct and operate subject to the following special conditions:

- C. The emergency generator shall be limited to 24 hours of operation per year for maintenance purposes.
 - D. The emergency generator shall only be allowed to operate during emergency situations outside of the testing and maintenance requirement found in Special Condition 5.C. and 5.D.
 - E. Shamrock Proppants, LLC shall meet the requirements of the applicable compression ignition internal compression engines (CI ICE) standards by using engines that are certified to meet the applicable standards based on size and model.
 - F. Shamrock Proppants, LLC shall maintain inspection, maintenance, and repair log(s) for the diesel generator.
 - G. Shamrock Proppants, LLC shall install a non-resettable meter or maintain a log for the diesel generator which records running total of the hours per year that the emergency diesel generator is in operation.
 - H. Shamrock Proppants, LLC shall record each time the emergency generator is used using Attachment A. The record shall include the date the generator was used, the purpose it was operated and for how long the generator was used for.
6. Record Keeping and Reporting Requirements
- A. Shamrock Proppants, LLC shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include Material Safety Data Sheets (MSDS) for all materials used
 - B. Shamrock Proppants, LLC shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which any record required by this permit show an exceedance of a limitation imposed by this permit.
7. Requirements for Future Alterations

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Shamrock Proppants, LLC shall notify the Air Pollution Control Program before initial startup of any modifications to the facility design that could impact the release parameters or emission rates as specified in the Memorandum from the Modeling Unit entitled "Ambient Air Quality Impact Analysis (AAQIA) for Shamrock Proppants, LLC – 2012-04-022" (June 21, 2012). In the event that the Program determines that the changes are significant, Shamrock Proppants, LLC shall submit an updated Ambient Air Quality Impact Analysis (AAQIA) to the Program that continues to demonstrate compliance with the Risk Assessment Levels.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2012-04-022
Installation ID Number: 139-0049
Permit Number:

Shamrock Proppants, LLC
122 Highway ZZ
Wellsville, MO 63384

Complete: July 27, 2011

Parent Company:
Shamrock Proppants, LLC
122 Highway ZZ
Wellsville, MO 63384

Montgomery County, S28, T50N, R6W

REVIEW SUMMARY

- Shamrock Proppants, LLC has applied for authority to construct a new plant that manufactures ceramic proppant.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are hydrogen fluoride (HF). Other HAPs are emitted from this process, including hydrogen chloride (HCl), but in levels less than their respective screen modeling action levels (SMALs).
- 40 CFR 60 Subpart OOO, "Standards of Performance for Nonmetallic Mineral Processing Plants" applies to the equipment.
- 40 CFR 60 Subpart UUU, "Standards of Performance for Calciners and Dryers in Mineral Industries" does not apply since this facility does not meet the definition of a mineral processing plant.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to this installation. None of the currently promulgated Maximum Achievable Control Technology (MACT) regulations apply to the proposed equipment.
- Baghouses are being used to control the particulate matter (PM), particulate matter less than 10 microns in aerodynamic diameter (PM₁₀), and particulate matter less than 2.5 microns in aerodynamic diameter (PM_{2.5}) emissions from the equipment in this permit.
- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, Construction Permits Required. Potential emissions of PM, Nitrogen Oxides (NO_x), Sulfur Oxides (SO_x), and total fluorides (excluding hydrogen fluoride) are greater than de minimis levels, but below major source levels. Potential emissions of all other pollutants are below de minimis levels.

- This installation is located in Montgomery County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was performed to determine the ambient impact of NO_x, SO_x, total fluorides and hydrogen fluoride (HF). PM potential emissions are above de minimis however there are no modeling requirements for PM.
- Emissions testing is required for the source.
- An Intermediate Operating Permit is required for this installation within 90 days of equipment startup or a Part 70 Operating Permit application is required for this installation within 365 days of equipment startup.
- Approval of this permit is recommended with special conditions.

INSTALLATION / PROJECT DESCRIPTION

Shamrock Proppants, LLC is seeking authority to operate a new plant that manufactures ceramic proppant in Montgomery County. Proppants are used in a process called hydraulic fracturing, also known as fracking, where pressurized fluid is used to create or extend hydraulic fractures in a rock layer for the purpose of releasing petroleum, natural gas, coal seam gas, or other substances for extraction. Proppant consists of materials, such as grains of sand, ceramic, or other particulates that prevent hydraulic fractures from closing when the fluid injection is stopped.

Appendix A contains a complete list of the equipment to be installed, the short-term maximum hourly design rate (MHDR), the bottlenecked MHDR and each emission unit's respective control device.

The manufacturing of the ceramic proppant at the Shamrock Proppants, LLC begins with the delivery of proppant material to the facility via truck. The proppant material is unloaded into one of two storage piles located in the storage building area (EP-01). From the stockpiles, it is transferred to the raw feed area (EP-02, EP-03, EP-04, EP-05) and then to the grinding area (EP-06, EP-07). After being properly sized, the proppant material proceeds to the formation area which consists of a set of bins, conveyance equipment and a mixer (EP-08 through EP-13). The material is then dried in one of two natural gas-fired dryers (EP-14, EP15). Each dryer is rated at a heat input of 14 million British thermal units per hour (MMBtu/hr). The dryers are both totally enclosed, fluid bed dryers that use waste heat from the kiln to operate.

After being screened and resized (EP-16 through EP-25, EP-30, EP-31), the proppant material proceeds to one of two kilns (EP-26, EP-28). All equipment from the raw feed area up to the kilns are vented to dust collectors to control particulate emissions. Both kilns are natural gas-fired rotary kilns and will be equipped with low NO_x burners to control NO_x emissions. The burners for each kiln are rated for a total capacity of 64 million British thermal units per hour (MMBtu/hr). From the kilns, the proppant material proceeds through their respective coolers (EP-27, EP-29) and then transferred to one of two dust bins (EP-30 and EP-31). Shamrock Proppants estimates that eight percent of the raw material is lost during the kiln process which coincides with maximum production rate of 36.8 ton of finished product per hour. After the coolers the product is sent to the finishing area where the proppant is screened again (EP-32, 33, and 34) prior to being conveyed by a bucket elevator (EP-35, 36 or 37) to one of 15 quality bins (EP-38 through EP-43). Lastly, the product proceeds through a set of bucket elevators, product feed bins, and product discharge bins (EP-45 through EP-59) before being loaded out via rail (EP-60) or truck (EP-61).

Shamrock Proppants, LLC introduces an additive (EP-65) to their process. The additive is expected to have VOC emissions which were included in the installation's total VOC potential emissions.

This is a new facility; therefore, no Operating or New Source Review permits have been issued to Shamrock Proppants, LLC from the Air Pollution Control Program. Based on the potential to emit of the installation as stated in Table 4, the facility will be considered a minor source for PM, NO_x, SO_x, total fluorides and HF.

Shamrock Proppants, LLC has requested confidentiality as allowed per 10 CSR 10-6.210 with regards to the emission factors used and type of raw materials processed due to the proprietary nature of the information. This information can only be obtained with written permission from Shamrock Proppants, LLC.

EMISSIONS/CONTROLS EVALUATION

Many of the emission factors used in this analysis have been deemed confidential. The emission factor and emission factor sources deemed confidential can be found in the confidential calculation spreadsheet with permission from Shamrock Proppants, LLC.

The emissions of concern associated with this project are as follows: 1) particulate matter emissions due primarily to the transfer, sizing and storage of the raw material and the finished product, 2) combustion emission associated with the combustion of natural gas in the dryers and kilns, and 3) SO_x, total fluorides and HF emissions that are released from calcining of the raw material in the kiln.

Particulate Emissions:

As shown in Appendix A, all emission units that are associated with the transfer, sizing and storage of raw material and finished product are controlled by baghouses. A PM₁₀ and PM_{2.5} control efficiency of 99 percent was given for the use of a baghouse. Stack testing to confirm the PM₁₀ and PM_{2.5} emissions is required for emission units that are associated with the transfer, sizing and storage of raw material and finished product as the emission factors used were not specific to processes being performed by Shamrock Proppants but were deemed to be most representative. The stockpiles (EP-01) are contained in a building with filtered ventilation. Because no special conditions were given for ensuring building capture efficiency, no capture or control efficiency was used in conjunction with emissions from the stockpiles. Also included are particulate emissions associated with haul road traffic. Since Shamrock Proppant's haul roads will be paved, the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 13.2.1 *Paved Roads* (January 2011) were used to estimate the emissions associated with the haul roads. A silt loading of 12 grams per meters squared (g/m²) was used in Equation 1 of Section 13.2.1.

Combustion and Calcining Emissions:

The potential emission associated with combustion of natural gas in the dryers and kilns were derived from vendor data and AP-42. Emission factors for total fluorides, HF and HCl emissions due to the calcining of raw clay in the kiln were obtained from, AP-42, Section 11.3, *Brick and Structural Clay Manufacturing* (August 1997). The potential emissions associated with the combustion of diesel or #2 fuel oil in the emergency generator were derived from AP-42, Fifth Edition, Section 3.3, *Gasoline and Diesel Industrial Engines* (October 1996) and the EPA Tier 3 Nonroad Diesel Engine Emission Standards. The emergency generator was included in the ambient air quality analysis for NO_x and SO_x. This resulted in specific requirements being implemented by the special conditions of this permit to ensure the diesel generator is operated as it was inputted in the modeling analysis.

Tank Emissions:

The potential emissions associated with the 500 gallon diesel storage tank were calculated using EPA Tanks 4.09b software.

Additive Emissions:

The potential emissions associated with the artificial additive that is introduced to the process were calculated using the additive's material safety data sheet (MSDS) and a mass balance approach.

The following table provides an emissions summary for this project. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8,760 hours per year). Since this facility is a new installation, there are no existing potential or actual emissions.

Table 4: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2010 EIQ)	Potential Emissions of the Installation
PM _{2.5}	10.0	N/A	N/A	4.04
PM ₁₀	15.0	N/A	N/A	14.40
PM	25.0	N/A	N/A	40.32
SO _x	40.0	N/A	N/A	164.88
NO _x	40.0	N/A	N/A	72.25
VOC	40.0	N/A	N/A	30.50
CO	100.0	N/A	N/A	50.59
Total Fluorides*	3.0	N/A	N/A	7.09
HAPs	25.0	N/A	N/A	17.72
HF	0.1	N/A	N/A	11.93
HCl	10	N/A	N/A	5.48
CO ₂	N/A	N/A	N/A	72,091
CH ₄	N/A	N/A	N/A	1.36
N ₂ O	N/A	N/A	N/A	0.14
GHG _(CO₂e)	100,000	N/A	N/A	79,545
GHG _(mass)	250	N/A	N/A	79,468

N/A = Not Applicable

*Total Fluorides excluding hydrogen fluoride.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM, SO_x and NO_x are above de minimis levels.

APPLICABLE REQUIREMENTS

Shamrock Proppants, LLC shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110

- *Operating Permits, 10 CSR 10-6.065*
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin, 10 CSR 10-6.170*
- *Restriction of Emission of Visible Air Contaminants, 10 CSR 10-6.220*
- *Restriction of Emission of Odors, 10 CSR 10-6.165*

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes, 10 CSR 10-6.400*
- *New Source Performance Regulations, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for Nonmetallic Mineral Processing Plants, 40 CFR Part 60, Subpart OOO*
- *Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260*
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating, 10 CSR 10-6.405*

AMBIENT AIR QUALITY IMPACT ANALYSIS

Ambient air quality modeling was performed to determine the ambient impact of SO_x, NO_x, total fluorides, and HF. For further details on the modeling, please refer to the memorandums titled “Ambient Air Quality Impact Analysis (AAQIA) for Shamrock Proppants, LLC – 2012-04-022” dated June 21, 2012.” The ambient air quality impact analyses indicates that this project will not cause ambient air concentrations above acceptable levels.

Table 5: Compliance with the Air Quality Standards

Pollutant	Modeled Impact (µg/m ³)	Standard (µg/m ³)	Time Period	Shamrock Significant Impact (µg/m ³) ^a	Significant Impact Level (µg/m ³) ^b	Impact Significant?
NO _x	1183.42 ^f	188.0 ^c	1-Hour	5.54	7.55	No
NO _x	25.37	100.0 ^c	Annual	N/D	N/A	-
NO _x	20.11	25.0 ^d	Annual	N/D	N/A	-
SO _x	231.40 ^f	195.0 ^c	1-Hour	5.54	7.80	No
SO _x	188.32	1300.0 ^c	3-Hour	N/D	N/A	-
SO _x	57.86	365.0 ^c	24-Hour	N/D	N/A	-
SO _x	10.36	80.0 ^c	Annual	N/D	N/A	-
SO _x	1124.54 ^f	512.0 ^d	3-Hour	4.41	25.0	No
SO _x	146.83 ^f	91.0 ^d	24-Hour	0.87	5.0	No
SO _x	7.18	20.0 ^d	Annual	N/D	N/A	-
Total Fluorides	0.372	13 ^e	Annual	N/D	N/A	-
Hydrogen Fluoride	9.09	820 ^e	1-hour	N/D	N/A	-
Hydrogen Fluoride	3.32	16 ^e	24-hour	N/D	N/A	-
Hydrogen Fluoride	0.23	14 ^e	Annual	N/D	N/A	-

^a Shamrock Proppants, LLC's highest impact of all receptors that showed an exceedance of the standard

^b Significant Impact Level is the threshold for establishing a project's emissions will not cause or

contribute to air pollution in excess of applicable NAAQS or increment standards.

^c National Ambient Air Quality Standard (NAAQS)

^d Increment Standard

^e Risk Assessment Level (RAL). The Risk Assessment Level (RAL) is a health based level developed by the Air Pollution Control Program and the Department of Health and Senior Services. Units are in micrograms per cubic meter.

^f During the modeling analysis by Shamrock Proppants, LLC, modeling exceedances of the standard at specific receptor locations were discovered based on the emissions from external sources. After further analysis it was determined that Shamrock Proppants, LLC did not contribute a significant impact at any of the receptor locations that modeled an exceedance. Therefore, Shamrock Proppants, LLC is in compliance with all applicable air quality standards.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

Gerad Fox
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated March 30, 2012, received April 3, 2012, designating Shamrock Proppants, LLC as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.

Appendix A: Emission Unit Summary
 Shamrock Proppants, LLC
 Montgomery County, S28, T50N, R6W
 Project Number: 2011-07-075
 Installation Number: 139-0049

Emission Point	Description	Short-term MHDR (ton/hr)	Bottlenecked MHDR (ton/hr)	Control Device No.	Description
EP-01	Stockpiles	N/A	1.2 acres	N/A	Enclosed Building with Filter Ventilation
EP-02	Ore Feed Bins #1, #2, #3	100	40.0	CD-01	Baghouse
EP-03	Ore Feed Bins #4, #5	100	40.0	CD-02	Baghouse
EP-04	Bucket Elevator	100	40.0	CD-03	Baghouse
EP-05	Screw Conveyor	20	20	CD-09	Baghouse
EP-06	Ball Mill	20	20	CD-04	Baghouse
EP-07	Ball Mill	20	20	CD-04	Baghouse
EP-08	Recycle Bin	20	20	CD-05	Baghouse
EP-09	Virgin Dust Bin #1	20	20	CD-06	Baghouse
EP-10	Virgin Dust Bin #2	20	20	CD-07	Baghouse
EP-11	Dust Bin	20	20	CD-08	Baghouse
EP-12	Screw Conveyor	20	20	CD-09	Baghouse
EP-13	Mixer	20	20	CD-10	Baghouse
EP-14	Dryer #1	60 ton/hr 14 MMBtu/hr	20 ton/hr 14 MMBtu/hr	CD-11	Baghouse
EP-15	Dryer #2	60	20	CD-12	Baghouse
EP-16	Bucket Elevator	20	20	CD-13	Baghouse
EP-17	Bucket Elevator	20	20	CD-14	Baghouse
EP-18	Green Screens	20	20	CD-15	Baghouse
EP-19	Green Screens	20	20	CD-16	Baghouse
EP-20	Screw Conveyor	20	20	CD-17	Baghouse
EP-21	Screw Conveyor	20	20	CD-18	Baghouse
EP-22A	Hammer Mill	20	20	CD-19	Baghouse
EP-22B	Hammer Mill	20	20	CD-19	Baghouse
EP-23	Bucket Elevator	20	20	CD-20	Baghouse
EP-24	Bucket Elevator	20	20	CD-21	Baghouse
EP-25	Surge Bins #1 & #2	20	20	CD-22	Baghouse
EP-26	Kiln #1	64 MMBtu/hr 35 ton /hr	64 MMBtu/hr 20 ton/hr	CD-23	Low NO _x Burners
EP-27	Cooler #1	35	20	N/A	N/A
EP-28	Kiln #2	64 MMBtu/hr 35 ton /hr	64 MMBtu/hr 20 ton/hr	CD-23	Low NO _x Burners
EP-29	Cooler #2	35	20	N/A	N/A

EP-30	Dust Bin #1	35	18.4	CD-24	Baghouse
EP-31	Dust Bin #2	35	18.4	CD-25	Baghouse
EP-32	Finish Screens	20	12.27	CD-26	Baghouse
EP-33	Finish Screens	20	12.27	CD-27	Baghouse
EP-34	Finish Screens	20	12.27	CD-28	Baghouse
EP-35	Bucket Elevator	20	12.27	CD-29	Baghouse
EP-36	Bucket Elevator	20	12.27	CD-30	Baghouse
EP-37	Bucket Elevator	20	12.27	CD-31	Baghouse
EP-38	Quality Bins #1, #2, #3	20	6.14	CD-32	Baghouse
EP-39	Quality Bins #4, #5, #6	20	6.14	CD-33	Baghouse
EP-40	Quality Bins #7, #8, #9	20	6.14	CD-34	Baghouse
EP-41	Quality Bins #10, #11, #12	20	6.14	CD-35	Baghouse
EP-42	Quality Bins #13, #14, #15	20	6.14	CD-36	Baghouse
EP-43	Quality Bins #16, #17, #18	20	6.14	CD-37	Baghouse
EP-44	Air Slide System	20	12.27	CD-38	Baghouse
EP-45	Bucket Elevator	20	12.27	CD-39	Baghouse
EP-46	Bucket Elevator	20	12.27	CD-40	Baghouse
EP-47	Bucket Elevator	20	12.27	CD-41	Baghouse
EP-48	Product Bins Feed	50	12.27	CD-42	Baghouse
EP-49	Product Bins Feed	50	12.27	CD-43	Baghouse
EP-50	Product Bins Feed	50	12.27	CD-44	Baghouse
EP-51	Product Bins Discharge	50	6.14	CD-45	Baghouse
EP-52	Product Bins Discharge	50	6.14	CD-46	Baghouse
EP-53	Product Bins Discharge	50	6.14	CD-47	Baghouse
EP-54	Product Bins Discharge	50	6.14	CD-48	Baghouse
EP-55	Product Bins Discharge	50	6.14	CD-49	Baghouse
EP-56	Product Bins Discharge	50	6.14	CD-50	Baghouse
EP-57	Bucket Elevator	50	12.27	CD-51	Baghouse
EP-58	Bucket Elevator	50	12.27	CD-52	Baghouse
EP-59	Bucket Elevator	50	12.27	CD-53	Baghouse
EP-60	Rail Loadout	150	18.4	CD-54	Baghouse
EP-61	Truck Loadout	150	18.4	CD-55	Baghouse
EP-62	Diesel Generator No. 1		250 hp	N/A	N/A
EP-63	Haul Road		2.232 VMT/hr	N/A	Paved
EP-64	Diesel Storage Tank	500 gallons		N/A	N/A

N/A = Not Applicable, MHDR = Maximum Hourly Design Rate; VMT = vehicle miles travelled

Mr. Chris Heller
Vice President – Chief Operating Officer
Shamrock Proppants, LLC
122 Highway ZZ
Wellsville, MO 63384

RE: New Source Review Permit - Project Number: 2012-04-022

Dear Mr. Heller:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and with your operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact Susan Heckenkamp, at the Department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:gfl

Enclosures

c: St. Louis Regional Office
PAMS File: 2012-04-022

Permit Number: